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brane originates either from the inner integument or from the nucellus. The following substances dissolved in water cannot pass through the membrane: NaF, KCl, KNO₃, K₂CO₃, Na₂CO₃, BaCl₂, Na₂SO₄, MgSO₄, AgNO₃, COCl₂, and sucrose; while HgCl₂, iodine, methyl and ethyl alcohols, ethyl ether, acetone, acetonitril, and chloroform with water as a solvent will enter. In dead grains the membrane still retains its semipermeable character. It is shown that water and the solutes capable of entering do so mainly through the embryo end of the grain. The membrane becomes permeable to AgNO₃ if alcohol is added to its water solution. Ether renders the coat more readily permeable to water, while treatment with osmic acid renders it less so. While this membrane, being of the non-protoplasmic type, is of great theoretical interest, it has not been demonstrated of any biological significance to the seed itself. In these cultivated forms it is probable that, if such a significance existed, it has been eliminated by selection. A study of this membrane in wild grasses might prove of interest. Many of the wild forms show delayed germination, and in one at least, wild oats, rupturing the coat overcomes the delay.—WILLIAM CROCKER.

Leaf-fall.—The phenomena accompanying the process of defoliation have been investigated by LEE²⁰ in nearly 50 species of trees and woody plants. The separation layer is formed from existing cells, with or without division, and cuts off the leaf by the degeneration and disappearance of the middle lamellae of the cells involved. The vascular elements are ruptured, but usually only after tyloses have filled them. The character of the invariably present protective layer is made the basis of classification, and the species studied are segregated according to whether the ligno-suberized protective cells arise (1) without further modification from existing cells; (2) after irregular division of existing cells; or (3) from a regularly active cambium. Whether the ligno-suberization comes before or after defoliation leads to subdivisions of the first two classes. The production of a cork layer continuous with the periderm of the stem usually follows in the growing season succeeding defoliation.—GEO. D. FULLER.

²⁰ LEE, E., The morphology of leaf-fall. *Annals of Botany* 25:51-106. 1911.